

REMARKS/ARGUMENTS

Favorable reconsideration of this application, as presently amended and in light of the following discussion is respectfully requested.

Claims 16-22 and 36-38 are pending in the application; Claims 16 and 17 are amended; Claims 1-15 are canceled; and Claims 23-35 are withdrawn by the present amendment. Claim 16 is amended to incorporate a portion of the subject matter recited in original Claim 17. Claims 36-38 are supported at least by the figures of the present application. Thus, no new matter is presented.

In the outstanding Official Action, Claims 16-22 were rejected under 35 U.S.C. §102(e) as anticipated by Gaillard et al. (U.S. Patent 6,500,773, hereinafter "Gaillard").

The undersigned appreciatively acknowledges the courtesy extended by Examiner Doan by holding a personal interview with the undersigned on June 2, 2005. The substance of the interview is reflected in the amended claims, and in the arguments presented below. No agreement was reached during the interview pending a formal response to the outstanding Official Action.

The outstanding Official Action asserts that Gaillard teaches all the elements of amended Claim 16, which, by virtue of the present amendment, includes portions of similarly rejected Claim 17. Applicants respectfully traverse this rejection.

The present claims are directed to a process for forming an integrated circuit using a tunable etch resistant anti-reflective (TERA) material. Specifically, a layer of dielectric material is formed on a substrate and a TERA material is then formed on the dielectric material. A damascene structure for a metal interconnect is then formed by using the layer of TERA material as one of a lithographic structure for the formation of the interconnect structure, a hard mask, an anti-reflective coating, or a chemical/mechanical polishing (CMP) stop layer. Claim 16 is amended herein to recite that a layer of light-sensitive material is

formed on the TERA material and that the optical properties of the light-sensitive layer and the TERA layer are substantially the same.

Specifically, amended Claim 16 recites a process for forming an integrated circuit structure, comprising:

“...forming a layer of dielectric material on a substrate;
forming a layer of tunable etch resistant anti-reflective
(TERA) material on said layer of dielectric material;
forming a layer of light-sensitive material on said layer
of TERA material, wherein the optical properties of said light-
sensitive layer and said layer of TERA material are
substantially the same...”

The light-sensitive material and the TERA material having the same optical properties mitigates the effects of substrate reflections at ultraviolet and deep ultraviolet wavelengths that cause standing waves in the light-sensitive layer due to thin film interference. That is, Claim 16 has been amended to clarify that the layer of TERA material acts as an antireflective coating in addition to being used to form the damascene structure.

Turning to the applied reference, Gaillard describes a method of depositing organosilicate layers which are compatible with integrated circuit fabrication processes. Figs. 3A-3E of Gaillard describe use of the organosilicate layer as an antireflective coating. Specifically, Gaillard describes that the refractive index and the absorption coefficient of the organosilicate layer are tunable, and then they can be varied in the desired range as a function of the deposition temperature as well as the gas composition used during layer formation.¹

Thus, the optical properties of the organosilicate layer of Gaillard are not formed to be substantially the same as the layer of light-sensitive material formed thereon, as recited in amended Claim 16. Moreover, Figs. 3A-3E of Gaillard do not disclose the antireflective coating being used to form a damascene structure as also required by amended Claim 1. Figs. 5A-5E of Gaillard show use of the organosilicate layer in a damascene structure. However,

¹ Gaillard at col. 2, lines 16-20.

in describing these figures Gaillard explains that the organosilicate layer (504) has a dielectric constant so as to prevent or minimize capacitive coupling between metal interconnects to be formed in the damascene structure.² The dielectric constant for the organosilicate layer is tunable, *in that it can be varied in the desired range as a function of the reaction temperature as well as the composition of the gas mixture during layer formation*.³ Gaillard, at no point, teaches or suggests that the optical properties of the organosilicate layer and the light-sensitive material are matched in the context of a damascene structure. Thus, as discussed above, Gaillard fails to teach or suggest forming a layer of light-sensitive material on said layer of TERA material, wherein *the optical properties of the light-sensitive layer and said layer of TERA material are substantially the same*, as recited in amended Claim 16.

Finally, Applicants' new Claims 36-38 recite that the step of forming damascene structure comprises using the TERA material as a hard mask, as a sacrificial layer, and as a CMP stop layer, respectively for performing the damascene structure. As seen in Figs. 5A-5E of Gaillard the organosilicate layer 504 is used in the damascene structure exclusively for its properties as a high dielectric constant layer. At no point during the formation of the damascene structure is the organosilicate layer used as a hard mask, sacrificial layer, or CMP stop layer to actually form the damascene structure. Thus, Applicants' new Claims 36-38 provide an additional basis for patentability over the cited reference to Gaillard.

Accordingly, Applicants respectfully request that the rejection of Claim 16 under 35 U.S.C. §102(e) be withdrawn. As Claims 17-22 depend from amended Claim 16, Applicants submit that these claims also patentably define over Gaillard.

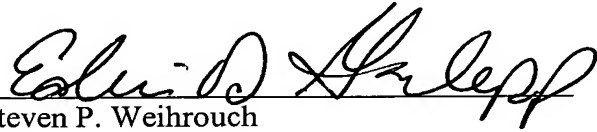
² Gaillard at col. 9, lines 3-13.

³ Id.

Consequently, in view of the present amendment and in light of the foregoing comments, it is respectfully submitted that the invention defined by Claims 16-22 is patentably distinguishing over the applied reference. The present application is therefore believed to be in condition for formal allowance and an early and favorable reconsideration of the application is therefore requested.

Respectfully submitted,

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